

Appl. No. 10/774,551
Am't. Dated August 18, 2006
Reply to Office Action of May 19, 2006

Attorney Docket No. 81716.0120
Customer No.: 26021

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REMARKS/ARGUMENTS:

Claim 16 is canceled without prejudice. Claim 9 is amended. Claims 9-11 and 17-21 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

The present invention relates to a ceramic circuit board which is constructed by a ceramic substrate and metal circuit plates attached to both surfaces of the ceramic substrate. (Applicant's specification, at p. 1, lines 5-7).

CLAIM REJECTIONS UNDER 35 U.S.C. § 102:

Claims 9 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Yamakawa (U.S. Patent No. 5,229,549). This rejection is moot with respect to claim 16 due to the cancellation of this claim. The Applicant respectfully traverses this rejection as to amended claim 9. Claim 9, as amended, is as follows:

A ceramic circuit board comprising:
a ceramic substrate having a through hole;
a metal column arranged within the through hole; and
metal circuit plates attached to both surfaces of the ceramic substrate in such a way as to stop up the through hole,
wherein the metal circuit plates attached to both surfaces of the ceramic substrate are connected to each other by the metal column,
wherein, between an inner wall surface of the through hole and an outer wall surface of the metal column is secured a space defining a cavity, wherein the cavity is free from any material, and
wherein the space defining the cavity exists along the entire length of the metal column.

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Applicant respectfully submits that Yamakawa cannot anticipate or render obvious claim 9, because Yamakawa fails to teach or suggest a space defining cavity that "exists along the entire length of the metal column."

In Figure 6 of Yamakawa, a gap is formed between the outer wall surface of the metal column and the inner wall surface of the through hole. A material such as a conductor pattern or a solder is in this gap. In contrast, in the present invention, the space defining the cavity extends along the entire length of the metal column, and the cavity (i.e., the gap) is free from any material. Yamakawa does not teach or suggest this limitation.

It is an aspect of the present invention that when heat is applied to the ceramic circuit board, the outer wall surface of the metal column, is expanded and swollen due to the difference in thermal expansion coefficient between the ceramic substrate and the metal column. The resultant expansion can be successfully accommodated by the space. This helps prevent the inner wall surface of the through hole from being pressed and expanded by the outer wall surface of the metal column, and thereby prevents the occurrence of a crack or fracture in the ceramic substrate. As a result, the ceramic circuit board can be operated normally and stably for a longer period of time." (Applicant's specification, at p. 12, lines 13-22).

In light of the foregoing, Applicant respectfully submits that Yamakawa cannot anticipate or render obvious claim 9, because Yamakawa fails to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

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CL. VIM REJECTIONS UNDER 35 U.S.C. § 103:

Claims 10 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamakawa in view of Inoue (U.S. Patent No. 4,816,823). The Applicant respectfully traverses this rejection.

Claims 10 and 11 depend from claim 9 and are patentable over Yamakawa for the reasons discussed above. Inoue cannot remedy the defect of Yamakawa and is not relied upon by the Office for such. Instead, the Office cites Inoue for teaching conductive elements of copper.

In light of the foregoing, Applicant respectfully submits that the cited references cannot render claims 10 and 11 obvious, because the cited references fail to teach or suggest each and every claim limitation. Withdrawal of this rejection is thus respectfully requested.

Claims 17-21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamakawa. The Applicant respectfully traverses this rejection.

Claims 17-21 depend from claim 9 and are therefore, patentable over Yamakawa for the reasons discussed above. Withdrawal of this rejection is thus respectfully requested.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.